

I CLAIM:

1           1. A system for providing wireless data communications between mobile units  
2       and a wired network, comprising:  
3                          a plurality of RF ports having at least one data interface, said RF ports being  
4       arranged to receive formatted data signals at said data interface and transmit corresponding RF  
5       data signals and arranged to receive RF data signals and provide corresponding formatted data  
6       signals; and  
7                          at least one cell controller, arranged to receive data signals from said wired  
8       network and to provide formatted data signals corresponding thereto to said data interface of said  
9       RF ports and to receive formatted data signals from said RF ports and to provide data signals  
10      corresponding thereto to said wired network, said cell controller controlling association of  
11      mobile units with one of said RF ports, providing formatted data signals for said mobile units to  
12      an associated RF port and receiving formatted data signals from said mobile unit from said  
13      associated RF port.

1           2. In a wireless data communications network coupled to a data processing  
2       system, having a plurality of RF ports and mobile units, wherein said mobile units associate with  
3       one of said RF ports to conduct data communications with said data processing system, the  
4       improvement wherein said mobile units are assigned to one of said RF ports by a cell controller,  
5       and wherein said cell controller is arranged to receive first data communications from said data

1 processing system and to relay said data communications to an assigned RF port and to receive  
2 second data communications from said RF ports and relay said second data communications to  
3 said data processing system.

1                   3. The improvement specified in Claim 2, wherein said cell controller, said RF  
2 data communications port and said data processing system are coupled to a switching hub.

1                   4. A method for operating a wireless local area network having at least one RF  
2 port, a plurality of mobile units and a cell controller coupled to said RF port, comprising:  
3                   operating said RF port to relay signals received from mobile units to said cell  
4 controller and to relay signals received from said cell controller to said mobile units, and  
5                   operating said cell controller to control association of said mobile units with said  
6 RF port, including sending and receiving association signals between said RF port and said cell  
7 controller, and  
8                   operating said cell controller to send messages to and from said mobile unit via  
9 said RF ports.

1                   5. A method for operating a wireless local area network as specified in Claim 4,  
2 wherein signals are sent between said RF port and said cell controller using a first data protocol,  
3 and wherein signals are sent between said RF ports and said mobile units using a second data  
4 protocol, and wherein said signals between said RF port and said cell controllers comprise data

1       packets using said first data protocol encapsulating data packets using said second data protocol.

1           6. A method for operating a wireless local area network as specified in Claim 5  
2       wherein said first protocol is an Ethernet protocol.

1           7. A method for operating a wireless local area network as specified in Claim 6  
2       wherein said second protocol is an IEEE Standard 802.11 protocol.

1           8. In a mobile unit for use in a wireless data communications system, said mobile  
2       unit having a data processor and programs for said data processor and a wireless network adapter  
3       having a programmed processor and a radio module, the improvement wherein said programmed  
4       processor performs first communications processor functions including control of said radio  
5       module and said data processor operates under said programs to perform second communications  
6       processor functions, including association with a radio access location of said wireless data  
7       communications system.

1           9. The improvement specified in Claim 8 wherein said first communications  
2       processor functions include cyclic redundancy check functions and acknowledgment functions.

1           10. In a wireless data communications system for providing data communications  
2 following a standardized protocol, said protocol including association of mobile units with radio  
3 access locations, the improvement wherein there is provided at least one RF port at a radio access  
4 location, said RF port comprising a radio module and an RF port processor in data  
5 communications with a programmed computer, wherein said RF port processor performs first  
6 functions of said standardized protocol and said programmed computer performs second  
7 functions of said standardized protocol, including said association of mobile units with said radio  
8 access location.

1           11. The improvement specified in Claim 10, wherein said RF port further  
2 includes a read-only memory and a random access memory, and wherein said read-only memory  
3 includes a bootloader program, wherein said RF port processor is arranged to operate under said  
4 bootloader program to download instructions from said programmed computer and to store said  
5 instructions in said random access memory, and wherein said RF port processor operates under  
6 control of said downloaded instructions to perform said first functions.

1           12. The improvement specified in Claim 10, wherein said standardized protocol  
2 includes cyclic redundancy check functions, and wherein said first functions include said cyclic  
3 redundancy check functions.

1           13. The improvement specified in Claim 10, wherein said standardized protocol  
2 includes encryption/decryption functions and wherein said first functions include said  
3 encryption/decryption functions.

1           14. The improvement specified in Claim 10, wherein said standardized protocol  
2 includes encryption/decryption functions and wherein said second functions include said  
3 encryption/decryption functions.

1           15. An RF port for use in a wireless data communications system comprising a  
2 radio module, having a data interface and a transmitter/receiver for wireless data  
3 communications, and a digital signal processor, having first and second data communications  
4 ports, random access memory and read-only memory, wherein said second data communications  
5 port is coupled to said data interface of said radio module, wherein said read-only memory is  
6 provided with a bootloader program for controlling said digital signal processor to load program  
7 instructions to said random access memory via said first communications port.

1           16. An RF port as specified in Claim 15, wherein said digital processor has a  
2 third data communications port and wherein said third data communications ports is coupled to  
3 said data interface of said radio module.

1           17. An RF port as specified in Claim 16, wherein said second and third  
2       communications ports of said digital processor comprise serial ports.

1           18. An RF port as specified in Claim 15, wherein said first communications port  
2       comprises a parallel port.

1           19. An RF port as specified in Claim 18 wherein said parallel port is coupled to  
2       an Ethernet controller.

1           20. A method for operating an RF port having a radio module, a digital processor,  
2       random access memory and read-only memory, comprising storing a bootloader program in said  
3       read-only memory, operating said digital processor to download instructions from a computer to  
4       said random access memory using said bootloader program and operating said RF port under said  
5       downloaded instructions to send and receive messages using said radio module.

1           21. A method as specified in Claim 20, wherein said step of operating said RF  
2       port comprises receiving messages from said computer including protocol message portions for  
3       RF message transmission, and transmitting said message including said protocol message  
4       portions as an RF signal.

1           22. A method as specified in Claim 20, wherein said step of operating said RF  
2 port comprises receiving RF messages having an RF protocol and sending said RF messages to  
3 said computer as data signals encapsulated in a further message protocol.

1           23. A method as specified in Claim 22 further comprising interpreting said RF  
2 protocol using said downloaded instructions and sending said RF messages to said computer  
3 only if said RF messages include an identification of said RF port.

1           24. A method as specified in Claim 20 wherein said downloaded instructions  
2 configure said computer and said RF port to operate as an access point for communication with  
3 mobile units.

1           25. A method as specified in Claim 24 wherein said computer is operated to  
2 control association of said mobile units with said computer and RF port.

1           26. A method as specified in Claim 20 wherein said downloaded instructions  
2 configure said computer and said RF port to operate as a mobile unit for communications with  
3 access points.

1           27. A method as specified in Claim 20 wherein said downloaded instructions  
2 configure said computer and said RF port to operate as either an access point or a mobile unit

1 under control instructions form said computer.

*Sub* 28. A method for transmitting signals having a wireless signal format using an RF port having a wired network interface, a data processor and an RF module, comprising providing signals to said wired network interface having wireless address data and message data within a data packet addressed to said RF port using a protocol for said wired network, operating said processor to provide wireless data signals having said wireless signal format for said address data and said message data to said RF module and operating said RF module to transmit said wireless data signals as an RF signal modulated with said wireless signal format.

29. A method for transmitting signals having a wireless signals format using an RF port having an Ethernet interface, a data processor and an RF module, comprising providing an Ethernet data packet to said Ethernet interface, said Ethernet data packet encapsulating as data a data message having said wireless signal format, operating said data processor to provide said data message to said RF module, and operating said RF module to transmit said data message as an RF signal.

30. A method as specified in Claim 29 further comprising operating said data processor to perform a cyclic redundancy computation on said data message and adding the result thereof to said data message.

1           31. A method as specified in Claim 29 further comprising operating said data  
2           processor to control said radio module.

3  
4           32. A method for receiving signals having a wireless signal format including  
5           wireless address data and message data at an RF port having a wired network interface, a data  
6           processor and an RF module, comprising operating said RF module to receive RF signals having  
7           said wireless signal format, operating said data processor to receive wireless data signals from  
8           said RF module and provide data signals to said wired network interface comprising a data  
9           packet having a source address corresponding to said RF port using a protocol for said wired  
10          network, said data packet including said wireless address data and said message data.

1           33. A method for receiving RF message signals having a wireless signal format  
2           including an address data format and message data using an RF port having an Ethernet interface,  
3           a data processor and an RF module, comprising receiving said RF message signals in said RF  
4           module and providing said signals as data signals to said data processor, operating said data  
5           processor to interpret address data in said data signals and, in dependence on said address data  
6           encapsulating said message data and address data in an Ethernet packet and providing said  
7           Ethernet packet to said Ethernet interface.

1           34. A method as specified in Claim 33 wherein said data processor is operated to  
2           encapsulate said address data in said Ethernet packet.

1           35. A method as specified in Claim 33 wherein said data processor is further  
2       operated to perform a cyclic redundancy computation on said message data and to compare the  
3       result thereof with corresponding data received in said data signals.

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5           36. A method as specified in Claim 33, further comprising operating said data  
6       processor to control said radio module.

1           37. A simplified wireless local area network system comprising:  
2       a computer having a data processor and a memory;  
3       an RF port having an RF port data processor, an RF module and a data  
4       communications interface coupled to said computer;  
5       a first program in said memory of said computer for operating said computer data  
6       processor to perform first wireless data communications functions, said functions including  
7       association with mobile units; and  
8       a second program for operating said RF port data processor to perform second  
9       wireless data communications functions.

1           38. A system as specified in Claim 37 wherein said second program operates said  
2       RF port data processor to perform second wireless data communications functions, including  
3       control of said RF module.

1           39. A system as specified in Claim 37 wherein said second program operates said  
2       RF port data processor to perform second wireless data communications functions, including  
3       cyclic redundancy check functions.

1           40. A system as specified in Claim 37 wherein said second program is stored in  
2       said computer memory and wherein said RF port data processor is arranged to download said  
3       second program.

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1           41. A wireless access device for providing wireless access to a communication  
2       system, comprising a modem for sending and receiving data messages on said communications  
3       system and an RF port, comprising a data interface coupled to said modem, a data processor and  
4       an RF module, said processor being programmed to receive data messages from said modem, to  
5       format said messages for wireless data communications and to provide said formatted messages  
6       to said RF module for transmission by RF data signals to at least one remote station, and to  
7       receive RF data signals from said at least one remote station, and to provide data messages to  
8       said modem to be sent on said communications system.

1           Sub A  
2           42. A wireless access device as specified in Claim 40 wherein said  
3       communications system is a DSL communications system connected to the Internet, and wherein  
4       said modem comprises a DSL modem.

1                                  *Sub A1* 43. A wireless access device as specified in Claim 40 wherein said  
2                                    communications system is a two-way cable communications system connected to the Internet,  
3                                    and wherein said modem comprises a cable modem.

1                                  44. A wireless access device as specified in Claim 42 wherein said  
2                                    communication system comprises a fiber optic system, and wherein said modem comprises a  
3                                    fiber optical modem.

1                                  45. A method for providing wireless access to the Internet, comprising providing  
2                                    a modem coupled to the Internet and having a data communications interface connected to an RF  
3                                    port, configuring said RF port for wireless data communication to a mobile unit having a  
4                                    predetermined wireless communications address, and providing at least one mobile unit  
5                                    configured with said predetermined wireless communications address for conducting RF data  
6                                    communications with said RF port, said RF port being arranged to relay communications  
7                                    between said mobile unit and said modem.

1                                  *Sub A2* 46. The method specified in Claim 44 wherein said step of providing said mobile  
2                                    unit, comprises providing a computer having an RF port.

1                          47. A system for sending and receiving data messages to at least one mobile unit,  
2                          comprising:

3 at least one RF port having an RF module for sending and receiving data  
4 messages to said at least one mobile unit using a first RF communications protocol, having a  
5 wired interface for sending and receiving data messages using a wired communications protocol,  
6 and a programmed processor for relaying data messages received on said wired interface using  
7 said RF communications protocol and for relaying data messages received by said RF module  
8 using said wired communications protocol; and

at least one cell controller for sending data messages to said wired interface of  
said RF port and for receiving data messages from said RF port using said wired communications  
protocol.

48. A system as specified in claim 47, wherein there are provided a plurality of said RF ports, and wherein said cell controller is arranged to address said data messages to said RF ports using said wired communication protocol.

1                   49. A system as specified in claim 48 wherein said at least one mobile unit is  
2                   associated with one of said RF ports, and wherein said processor is programmed to interpret  
3                   source address data received in said RF communications protocol and for relaying a received  
4                   message using said wired communications protocol only if said source address data corresponds  
5                   to a mobile unit associated with said RF port

1           50. A system as specified in claim 47 wherein said cell controller is arranged to  
2 provide messages to said RF port comprising mobile unit address data and message data  
3 encapsulated in a data packet following said wired communications protocol.

1           51. A system as specified in claim 50 wherein said cell controller is arranged to  
2 provide said mobile unit address data and said message data in said RF communications protocol  
3 encapsulated in said wired communications format.

1           52. A system as specified in claim 47 wherein said RF port is arranged to  
2 encapsulate messages received by said RF module in a data packet using said wired  
3 communication protocol.

1           53. A method for operating a wireless data communication system having at least  
2 one cell controller, at least one RF port and at least one mobile unit, comprising sending a first  
3 data message for said mobile unit from said cell controller to said RF port using a wired  
4 communication protocol, relaying said first message in said RF port using an RF communication  
5 protocol and sending said first message by radio signal from said RF port to said mobile unit.

1           54. The method specified in claim 53 wherein there are a plurality of RF ports  
2 and wherein said mobile unit is associated with one of said RF ports, and wherein said first data

1 message is addressed to said RF port associated with said mobile unit.

1           55. The method specified in claim 53 wherein sending said first data message to  
2        said RF port comprises sending address data and message data encapsulated in a data packet  
3        using said wired communications protocol.

1           56. The method specified in claim 55 wherein said encapsulated address data and  
2        message data is formatted according to said RF communications protocol.

1           57. The method specified in claim 53, further comprising sending a second data  
2        message from said mobile unit to said RF port by radio signal using said RF communication  
3        protocol, and relayting said second data message using said wired communication protocol from  
4        said RF port to said cell controller.

1           58. A method for operating a wireless data communications system having at  
2        least one cell controller, at least one RF port and at least one mobile unit, comprising sending a  
3        data message by radio signal from said mobile unit to said RF port using an RF communications  
4        protocol, and relaying said message using a wired communication protocol from said RF port to  
5        said cell controller.

1           59. The method specified in claim 58 wherein said relaying comprises

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- 1 encapsulating said RF communications protocol message in a data packet using said wired
- 2 communications protocol.

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